



COMMUNITY DEVELOPMENT DEPARTMENT POLICY & PROCEDURE

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TITLE: The City Policy for Site-Specific Seismic Fault Investigations

PURPOSE:

The purpose of this policy is to ensure that non-exempt developments initiate a site-specific fault-rupture investigation according to the California Building Code in effect and following procedures of the California Geological Survey (CGS; 2018a). The major purpose of the site-specific seismic fault investigation is to identify and to prohibit construction of structures intended for human occupancy across the traces of active faults, and thereby to mitigate the hazard of surface and near-surface fault rupture.

Prior to issuance of building permits, current City regulations and practice require that applicants (typically owners/developers) for proposed developments conduct an appropriate site-specific fault-investigation, the ultimate intent of which is to ensure public health, safety and welfare. In January 2018, the CGS designated the Santa Monica and Hollywood faults as “Earthquake Fault Zones” (EFZ) likely underlain by active faults capable of surface ground rupture (CGS, 2018b). The Inglewood and West Pico EFZ currently “terminates” at the City limits, but nevertheless requires similar geological evaluation for those projects on reasonable trend (CGS 2018b). The likely connection between the Santa Monica and the Hollywood EFZs is currently unknown and hence projects between them may similarly require geological evaluation. Accordingly, as a matter of public safety and policy, the City, as the decision-making (lead) agency, follows the authority given to the City Building Official by the 2016 California Building Code, including recommendations and guidelines established by the CGS (2018a), the pertinent provisions are outlined as follows:

1. The 2017 California Building Code, Chapter 18 Soils and Foundations, Section 1803 Geotechnical Investigations, subsection 1803.5.11 Seismic Design Categories C

through F, states “For structures assigned to Seismic Design Category C, D, E, or F, a geotechnical investigation shall be conducted, and shall include an evaluation of all of the following potential geologic and seismic hazards:

- i. Slope instability.
 - ii. Liquefaction.
 - iii. Total and differential settlement.
 - iv. Surface displacement due to faulting or seismically induced lateral spreading or lateral flow.
2. The Alquist-Priolo (AP) Act was enacted in 1972 following the February 1971 Sylmar earthquake (summarized in CGS, 2018a). The main intent of the AP is to prevent construction of habitable structures across an “active fault,” presently defined by the State as “a fault that has had surface displacement within Holocene time (about the last 11,700 years), hence constituting a potential hazard to structures that might be located across it.” [14 Cal. Code Regs. Section 3601(a)]. Any fault where surface or near-surface displacement cannot be documented as pre-Holocene is regarded as “active” until clearly demonstrated otherwise (CGS, 2018a).
3. The State Geologist (CGS) is mandated to establish earthquake fault zones (EFZ) across known or reasonably inferred active faults. A project affected by the AP (PRC Section 2621.6) generally includes any structure for human occupancy. Consistent with policies of nearby agencies, the following *exceptions* are identified dependent on review and formal acceptance by the Building Official:
 - A) Single-family, wood-frame or steel-frame dwellings to be built on parcels of land for which geologic reports have been approved by the lead agency [in this case, the City of Beverly Hills];
 - B) A single-family wood-frame or steel-frame dwelling not exceeding two stories when that dwelling is not part of a development of four or more dwellings.
 - C) Additions to existing one- or two-family dwelling units when all of the following conditions are met:
 - i. There is no increase in the number of bedrooms or bedroom equivalent rooms in the dwelling unit;
 - ii. The addition does not increase the permitted gross floor area of the structure by more than 20 percent as it existed on January 1, 2018, or 400 square feet, whichever is less;
 - iii. The Building Official has determined that the addition is not located over or upon the trace of a known active earthquake fault as shown on the most current AP or City-zone maps or any reasonable projection of an inferred fault; and

iv. The owner shall record in the office of the City Clerk a statement acknowledging that the owner is aware that the records of the Building Official indicate that the property is potentially subject to a hazard from a known active earthquake fault. The owner shall also record in the office of the City Clerk an agreement relieving the City and all officers and employees thereof of any liability for any damage or loss, which may result from the issuance of such a permit. This agreement shall be binding on all successors in interest of the owner and shall continue in effect until the Building Official records in the office of the City Clerk a statement that a hazard from a known active earthquake fault no longer exists.

The City may impose investigation requirements more restrictive than those required by State regulations particularly in light of ever evolving changes to professional standards-of-practice. The City may therefore require that applicants for developments of four or more “units,” whether in or out of an EFZ, conduct appropriate, site-specific fault investigations with documentation subject to peer review by a technically qualified geologist retained by the agency.

PROCESSES AND PROCEDURES:

The owner/developer is responsible to conduct the required fault-activity investigations. The documentation (usually draft and final reports) is then submitted to the City for review and potential approval. The City does not employ a staff geologist; thus, all fault investigation reports are evaluated by an external, State-licensed, technically qualified reviewer who specializes in fault assessments. This reviewer is retained by the City to assess the scope and technical documentation provided by the consultants-of-record, including their professional opinions and conclusions, as to the possible presence and relative impact of active faults within and adjacent to the proposed development. The reviewer also determines whether or not the particular site-specific investigation meets the current geologic standard-of-practice for evaluating potential surface-fault rupture.

When all fault issues have been adequately addressed, the City’s reviewer briefly summarizes the investigation scope and conclusions, and whether or not these conform to current building codes and geologic standards-of-practice. Ultimately, if warranted, the reviewer then provides the City with a formal “Recommendation for Acceptance.” Under current practice, and as common in other lead agencies, the local Building Official relies on the geological review to make an informed decision about acceptance. In the interest of public health and safety and as provided in the 2017 California Building Code (see above), other geologic and geotechnical concerns may also have to be addressed; e.g., potential ground deformation owing to seismically induced liquefaction. Specific investigation principles are provided in “Guidelines for Evaluating Potential Surface-Fault Rupture Within the City of Beverly Hills, California” available on the City website. The documentation for these seismic and other pertinent geological issues are then reviewed by the City’s in-house staff or by a contracted specialist as needed. As authorized by the A-P Act, the City imposes and collects fees for: (1) Technical Reviewer professional services; (2) overhead (currently 15 percent) based on Reviewer services; (3) in-

house engineering evaluations; and (4) permits for drilling, excavation or other activities impacting City rights-of-way. When all code-mandated investigations have been completed and accepted, and when all required fees have been received, the City Building Official may then issue a building permit.

REFERENCES:

California Geological Survey, 2018a, Earthquake Fault Zones: A guide for government agencies, property owners/developers, and geoscience practitioners for assessing fault rupture hazards in California: Special Report 42, 82 p. [available online]

California Geological Survey, 2018b [B. Olson, author], The Hollywood, Santa Monica and Newport-Inglewood faults in the Beverly Hills and Topanga 7.5' quadrangles, Los Angeles, County, California: California Geological Survey Fault Evaluation Report (FER) 259, 74 p. [available online]

City of Beverly Hills, 2018, Guidelines for Evaluating Potential Surface-Fault Rupture Within the City of Beverly Hills, California, 3 p. [available online]



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GUIDELINES FOR EVALUATING POTENTIAL SURFACE-FAULT RUPTURE WITHIN THE CITY OF BEVERLY HILLS, CALIFORNIA

(Revised September 2019)

As the decision-making (Lead) agency, the City of Beverly Hills has the duty to protect the health, safety, and welfare of the public by minimizing the potential adverse effects of surface-fault rupture. Accordingly, the City requires that the owners/developers (applicant) for proposed development of habitable structures of four or more occupants complete an appropriate “standard-of-practice” geological investigation to ensure that active faults do not underlie the site or, if present, are appropriately mitigated by avoidance (structural setbacks). All sites are different, and hence a wide variety of geological investigation techniques may be appropriate for a specific location. The following Guidelines and general information recognize this reality, and enumerate general procedures to assist the permit applicant and the consultants-of-record to conduct adequate and yet reasonable investigations consistent with maintenance of public health and safety.

1. An “active fault” is currently defined by the California Geological Survey (CGS) as one having surface or near-surface ground rupture within the last ~11,700 years, regardless of recurrence interval or amount of displacement per event (CGS, 2018a). Further, new CGS investigation criteria now state that “faults within a formally designated Earthquake Fault Zone (EFZ) are presumed to be active until determined otherwise” (CGS, 2018a, p. 27). The City follows these definitions and investigation criteria, but recognizes that in certain situations, on a site-specific basis, a “reduced” setback zone may be considered if accompanied by well documented engineering mitigation. If appropriate this option requires “above-average” site-specific technical documentation that should be discussed with and accepted by the City Technical Reviewer.

2. Fault-rupture investigations must meet current geologic standards-of-practice. Such practice changes over time. It is therefore the duty of the geologic consultants to keep abreast of and to employ the latest investigation techniques. Many such techniques are provided in CGS Note 49 “Guidelines for Evaluating the Hazard of Surface Fault Rupture;” a document that is periodically revised and readily available via the CGS website. **Important:** Both the Applicant and the Consultants-of-Record are strongly urged to obtain, review, understand and comply with the recommended fault-investigation

procedures spelled out in the latest revision of CGS Publication 42 (CGS, 2018a). At present, the CGS has designated the “Santa Monica Fault Zone” and the “Hollywood Fault Zone” as EFZs (CGS, 2018b). Additionally, current CGS mapping projects the Inglewood and West Pico EFZs directly into the City (CGS, 2018b [Fault Evaluation Report]). All relevant CGS documents are readily available on the CGS website. Thus, in accordance with professional standards-of-practice and for their specific project, the Consultants should also evaluate the possible impact of all mapped and inferred faults that may reasonably affect the property of interest. The Consultants are thus urged to be “proactive” in their analyses, rather than rely solely on existing maps, which are periodically updated. Seldom does the CGS remove “active faults” from EGZ maps, but new ones are frequently added based mainly on seismic activity and new investigations.

3 Projects outside present EFZ’s also require suitable investigations in conformance with the City’s duty to assure public health and safety from the potential of surface rupture. Heretofore, active faults within the City were not previously documented and thus warranted for inclusion into an EFZ. Now, however, several new investigations provide technical information to verify or negate previously inferred fault impact. Although site-specific trenching is currently not required for projects outside present, CGS-designated EFZ’s, the Consultants-of-Record should prepare a suitable investigation plan for submission to, and discussion with, the City’s designated Technical Reviewer.

4. Well documented trenches of sufficient length and depth are currently regarded as the most useful indicator of potential fault presence and relative activity. Trenching is the “standard” and is a general requirement in Beverly Hills and in adjacent jurisdictions. Presumably, trench locations will “shadow” faults in existing EFZ’s, but also will consider other EFZ faults reasonably projected into the City (CGS, 2018b). Such subsurface exploration may also entail emplacement, collection and interpretation of continuous cores, advancement and interpretation of cone penetrometer tests (CPT), and – if appropriate – geophysical surveys. Trench depth and number of cores or applicability of other exploratory techniques will vary from site to site, and thus no specific procedures are specified other than the requirement to carry out standard-of-practice investigations, which invariably change with time and place. The applicant’s (owner/developer) geological consultants should be aware of and employ appropriate investigation techniques, many of which are spelled out in CGS Note 49 and revised Special Publication 42 (2018a), both available on the CGS website.

The City recognizes that trenching may be spatially constrained in highly urbanized areas and that, for safety, only closely spaced CPTs and continuous cores might be appropriate for the initial investigation. If appropriate for a particular site, the Consultants may thus wish to “emulate a deep trench” by emplacing and downhole logging closely spaced bucket-auger borings. These are particularly practical when the likely Pleistocene-Holocene boundary is more than ~20-ft below ground surface. Recent investigations show that bucket-auger exposures may reveal vertical to near-vertical faults “missed” in previous CPT and continuous-core stratigraphic correlations.

In lieu of site trenching or bucket-auger logging, the Consultants and Permit Applicant may opt to wait until building demolition and therefore exposure of underlying sediments amenable to trenching or other means to expose the Pleistocene-Holocene boundary. Therefore, based on the permit applicant's request and on technical justification, the consultants' preliminary report can be submitted for potential "*Recommendation for Conditional Acceptance*" until lot clearance is followed by on-site trench(es) or detailed geological documentation of foundation cuts. Should this option be contemplated, the applicant's geological consultants should so discuss with the City reviewer.

5. Additions or substantial modifications to existing habitable structures may require fault-activity investigations, depending mainly on the extent (size) of the proposed changes. Specific information about investigation procedures is provided in the City "Policy & Procedure" document available online or at the Community Development Department.

6. The geological investigation and related report(s) are to be performed, and signed, by a Professional Geologist (PG) licensed in the State of California. Specialists in numeric, relative, or other fault and sediment-dating techniques are expected to substantiate their investigation methods and conclusions in one or more Appendix reports as needed.

7. For trench and bucket-auger exposures, continuous cores and other site-specific geologic data, applicants' consultants should request field observations by the City reviewer for identifying possible technical issues early in the investigation. The City, as Lead Agency, has the responsibility to assess whether or not the Consultant's report(s) comply with current standard-of-practice, fault investigations.

8. In accordance with City regulations, the designated reviewer will commence communications with the applicant and consultant, upon City receipt of review fees and formal authorization by a designated Building Official.

It is strongly recommended that the applicant's geological consultants meet with the City reviewer to discuss the proposed investigation plan(s). Consultant communication with the reviewer is encouraged throughout the investigation, primarily to avoid or reduce any problems that may arise.

9. The applicant(s), through the geological consultant, will ultimately submit a formal report to the City Reviewer that describes the investigation procedures and technical conclusions. The reviewer will then comment on the report and likely meet with the consultant(s) to resolve any issues. The reviewer will recommend "acceptance" when the report complies with the City's requirements. As requested, the reviewer will also respond to the consultants' technical questions during the entire review process.

The City requires that the Consultants-of-Record submit two "hard copies" and an electronic copy (flash drive) of the final report accompanied by the Technical Reviewer's "*Recommendation for Acceptance of Investigation and Report.*" The City then typically

requires approximately one week thereafter to verify that all appropriate fees have been paid prior to formal issuance of “*Approval of Investigation and Report*.” As required by law, the City submits the Consultant’s report to the CGS where it inherently becomes a public document available for download by any interested party. As appropriate, Consultants should review these documents when preparing their proposed investigation plans.

10. These Guidelines apply only to investigation of potential surface-fault rupture. Requirements to investigate, identify and mitigate other possible geological or geotechnical hazards, such as high seismic accelerations, liquefaction and related ground deformation, or landslides and mudflows, are currently subsumed within the latest California Building Codes and thus subject to review by City officials or by a designated external peer reviewer. These Guidelines may be subject to change based on acquisition of new data and on local experience. Accordingly, the applicant and consultants should periodically communicate with the City and/or reviewer as appropriate.

11. Trench excavation shall be done in a safe manner. The following is required by the Department:

- a) Consulting firms conducting trench exploration are required to have their annual CalOSHA permit current. Proof of the annual permit and notification to CalOSHA of the specific project shall be on site at all times.
- b) Underground Service Alert must be notified at least two days prior to excavation. Consideration should also be given for the use of a private utility locator utilizing electromagnetic utility locating techniques and/or ground penetrating radar to map out the location of known or suspected utilities.
- c) Permits from the Department of Public Works are required for excavations in the public right-of-way.
- d) CalOSHA regulations regarding trench safety shall be followed, with appropriate shoring and/or benching, ladders and/or exit ramps, etc.
- e) Trenches left overnight shall be secured by locked fencing. In some cases, it may be appropriate to cover the trenches with steel plates or chain link fencing for an added precaution. (See [BH-113](#) for “Steel Plate For Open Trench Detail”)
- f) The Department’s reviewing geologist shall be invited to observe the trench(es) after they are secured; shored or benched, cleaned, and a string line or grid reference system is in place. A completed field log is preferred but not a formal requirement.
- g) For major projects, invitation to CGS geologists and other paleoseismic experts to view trenches is encouraged.

- h) A grading permit is required for trench excavation as well as backfilling the trench with primary or secondary certified fill. Otherwise, backfill will be considered uncertified.
- i) Spoil piles should be protected from erosion during the rainy season and not encroach neighboring property.
- j) Trenches should not remove lateral support from adjoining property, buildings on or off the site, or public right-of-way.
- k) Below is the link to City of Beverly Hills Public Right-of-Way use and Hauling regulations, approved heavy haul routes, and required permits.
<http://www.beverlyhills.org/business/constructionlanduse/publicrightofwayhauling/>

PERTINENT REFERENCES

California Geological Survey, 2002, Guidelines for evaluating the hazard of surface fault rupture: Technical Note 49, 4 p.,

California Geological Survey, 2018a, Earthquake Fault Zones: A guide for government agencies, property owners/developers, and geoscience practitioners for assessing fault rupture hazards in California: Special Report 42, 82 p.

California Geological Survey, 2018b [B. Olson, lead author], The Hollywood, Santa Monica and Newport-Inglewood faults in the Beverly Hills and Topanga 7.5' quadrangles, Los Angeles, County, California: California Geological Survey Fault Evaluation Report (FER) 259, 74 p.